evaluate 1) the association between LP and a change in left ventricular function and 2) the effect of acute (<24 h) i.v. enaprilat followed by 3–6 months of oral enalapril on the presence of LP.

Left ventricular function was evaluated by echocardiography day one, at discharge and after 3–6 months using global wall motion determined ejection fraction (WMI-EF). LP was measured at discharge and after 3–6 months using 2 out of 3 criteria (40 Hz): 1. QRS-duration > 115 ms, 2. RMS 40 < 20 microV and 3. LAS > 38 ms.

At discharge LP was present in 25% (n = 14) of the pts prospectively randomised to enalapril (n = 28)/placebo (n = 28).

WMI-EF in pts with/without LP at discharge:

	day 1	discharge	3–6 months
LP + (WMI-EF)	43.2 ± 8.1	45.3 ± 7.8	44.1 ± 9.3
LP – (WMI-EF)	46.8 ± 9.9	51.3 ± 8.7	53.1 ± 8.7
	p = NS	p < 0.03	p < 0.01

At discharge LP was present in 12/28 pts on placebo and 2/28 pts on enalapril (p < 0.01). At 3–6 months LP was present in 11/27 pts on placebo and 3/28 on enalapril (p < 0.05).

Thus 1) LP predicts a lack of improvement in left ventricular function and 2) early ACE-inhibitor treatment may modify the presence of LP after myocardial infarction.

961-80 Surface Laplacian ECG Maps Provide a Sensitive and Localizing Measure of Cardiac Ischemia

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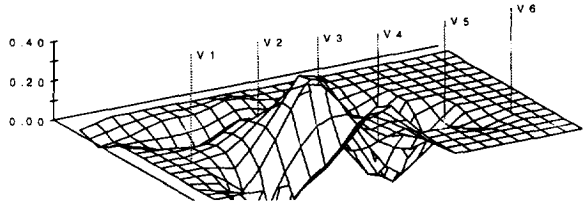
To test the hypothesis that Laplacian surface electrocardiography provides a sensitive and local measure of coronary ischemia, we studied six consecutive patients undergoing balloon angioplasty. Three self-adhesive pads of electrodes containing 84 multipolar Laplacian electrodes were applied to the anterior and left-lateral thorax. Laplacian electrograms and a standard 12 lead ECG were recorded prior to and during each balloon inflation. The ratio of ST segment shift to baseline QRS amplitude (*ST/Q*) was computed for the Laplacian electrodes and the standard 12 leads. Defining *ST/Q* = 0.1 to be the minimum significant ST shift, Laplacian maps in all six patients revealed a significant ST shift during balloon inflation while the 12 lead ECG revealed a significant ST shift in only three patients. The mean peak value of *ST/Q* in the Laplacian maps was 0.40 versus 0.13 in the 12 lead ECG (p = 0.01). Laplacian maps of *ST/Q* showed localized elevation over the expected region of distribution of the occluded vessel, often surrounded by a region of negative *ST/Q*. The unipolar leads revealed a diffuse bipolar pattern of ST segment shift. *Conclusion:* Body surface Laplacian mapping may provide a sensitive and accurate noninvasive means of detecting and localizing cardiac ischemia, superior to the 12 lead ECG.



Laplacian *ST/Q* map during distal left anterior descending coronary artery occlusion.

961-81 Time Domain and Spectral Turbulence Analysis of Signal Averaged Electrocardiography as Prognostic Determinants in Idiopathic Dilated Cardiomyopathy

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Identification of patients with idiopathic dilated cardiomyopathy (IDC) with poor prognosis [sudden death (SD) or progressive heart failure (PHF)] represents a major management problem. The signal averaged electrocardiogram (SAECG) is potentially a non-invasive marker of clinical outcome in IDC. This study compared the ability of time domain (Td) and spectral turbulence analysis (STA) of the SAECG to predict SD/PHF in IDC patients. SAECG were recorded in 58 consecutive patients with IDC (WHO criteria; age 41 ± 14 years) presenting to our hospital and followed over 26 ± 19 months. During the follow up 17 patients had SD/PHF and 41 remained symptomatically and echocardiographically stable. In this population, 27 patients with left bundle branch block or who took anti-arrhythmic drugs had been excluded. Conventional Td (40 Hz, Butterworth filter) and STA analysis were performed using Del Mar 183 software. *Result* There were significant differences in all STA parameters (low slice correlation ratio, interslice correlation mean, interslice correlation standard deviation and spectral entropy) between SD/PHF and stable patients (p < 0.01), but in none of the Td parameters (tQRS, LAD40, RMS40). SD/PHF was more likely in patients with an abnormal (≥3 abnormal STA parameters) compared to a normal STA result (56% vs 19%; p = 0.005). There was a significant difference in event free survival at 1 year between patients with abnormal and normal STA (61% vs 88%; p = 0.03), but the presence of late potentials was not discriminatory (72% vs 82%; p = 0.4). The sensitivity, specificity and total predictive accuracy for predicting SD/PHF were 29%, 85% and 69% (p = 0.2) for Td and 53%, 83% and 74% (p = 0.005) for STA analysis. The positive predictive characteristics curves showed that higher positive predictive accuracies were achieved by STA compared to those of Td analysis. The differences were significant at different sensitivity levels (at 50%, 60%, 70%, p = 0.05; 80%, p = 0.01). The relative risk (95% CI) of SD/PHF was 2.1 (0.7–6.0) for presence of late potentials and 3.5 (1.4–9.2) for abnormal STA result. *Conclusion* STA analysis of SAECG is a more sensitive and specific predictor of SD/PHF than Td analysis for IDC patients and has an important role in clinical management.

961-82 Abnormal Signal Averaged Electrocardiogram Predicts Mortality in Patients with Non-Ischemic Cardiomyopathy and Severe Congestive Heart Failure

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Patients with severe congestive heart failure have a high mortality; many deaths are thought to be arrhythmic. The presence of late potentials on signal averaged electrocardiograms (SAECG) identifies a substrate for reentrant ventricular arrhythmias. We evaluated the prevalence and prognostic significance of an abnormal SAECG in a prospectively followed population of patients undergoing evaluation for cardiac transplantation. Ninety patients were followed for a mean of 447 days. Twenty-six patients died and 17 patients were censored on the day of transplantation. Kaplan-Meier survival curves were constructed and the effect of SAECG variables was tested with a log-rank test. Fifty-four percent of the patients had a non-ischemic cardiomyopathy and the remainder had an ischemic cardiomyopathy. Fifteen patients had BBB and were excluded from this analysis. The average QRS duration on 12 lead ECG was similar in ischemic cardiomyopathy and non-ischemic cardiomyopathy groups (116 ± 23 vs 115 ± 19 ms, p = ns) and the average fQRS duration was similar in ischemic cardiomyopathy and non-ischemic cardiomyopathy groups (131 ± 26 vs 132 ± 21 ms, p = ns). Forty-four percent of the non-ischemic cardiomyopathy group and 50% of the ischemic cardiomyopathy group had an abnormal SAECG (defined as having 2 of the following: fQRS > 114 msec, RMS < 20 μV, LAS > 38 msec). An abnormal SAECG was associated with mortality in the non-ischemic cardiomyopathy group (p < 0.05) but not in the ischemic cardiomyopathy group (p = ns). Twenty-eight patients had QRS duration ≥ 120 ms on 12 lead ECG. When these patients were excluded, 20% of the non-ischemic cardiomyopathy group and 41% of the ischemic cardiomyopathy group had an abnormal SAECG and an abnormal SAECG still predicted mortality in non-ischemic cardiomyopathy group (p < 0.001) but not in ischemic cardiomyopathy group (p = ns). In conclusion, an abnormal SAECG is associated with increased mortality in non-ischemic cardiomyopathy but not in ischemic cardiomyopathy.

962 New Imaging Protocols and Pharmacologic Stress

Tuesday, March 21, 1995, Noon–2:00 p.m.
Ernest N. Morial Convention Center, Hall E
Presentation Hour: Noon–1:00 p.m.

962-61 Late Redistribution Tl-201/Stress Tc-99m Sestamibi Separate Acquisition Dual Isotope Myocardial Perfusion SPECT: A Feasibility Study

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Rest Tl201(Tl)/stress Tc-sestamibi dual isotope SPECT (DIMPS) is an efficient myocardial perfusion protocol. Patients with rest defects, however, frequently require late Tl redistribution imaging the next day. Thus, we recently implemented a modified DIMPS (M-DIMPS), with 3.5 mCi Tl injected at rest the night before stress testing. On the day of stress testing, 12–18 hr redistribution Tl (late Tl) SPECT was performed prior to stress sestamibi study.